Facilities Engineering
Project Management Manual

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia

Facilities Engineering
Project Management Manual

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Summary of Changes

Change	Section	Date	Ver

Note: The Revision Number will change on the signature page (page 2) and all other pages in this document. This document will be approved by signature each time a revision is issued.

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ABBREVIATIONS, ACRONYMS, AND INITIALIZATIONS

AutoCAD	computer-aided design drafting software
CAD	computer-aided design
CF	Center Funded (funding category)
CoF	Construction of Facilities (funding category)
CO	Contracting Officer
COTR	Contracting Officer's Technical Representative
CD	configuration drawing
CM	configuration management
CMMS	Computer Maintenance Management System
f: drive	"facilities" drive on the wff-loki server
FPIH	Facilities Project Implementation Handbook
FOM	Facility Operation Manager
FMB	Facilities Management Branch
FPMS	Facility Project Management System
GIS	Geographic Information System
GSFC	Goddard Space Flight Center
ID	identification
LAN	local area network
Maximo	CMMS software system
NASA	National Aeronautical and Space Administration
PM	Project Manager
WFF	Wallops Flight Facility

1.0 Introduction

The goal of this reference is to provide a concise desktop reference outlining the procedure of project initialization, planning, design, and construction used by Facilities Management Branch (Code 228) at the NASA Goddard Space Flight Center, Wallops Flight Facility. This reference is intended to be a tool to promote consistent and orderly project management and design in accordance with the stated mission to provide high quality, cost effective infrastructure and support. However, it is not intended to replace the NASA, Facilities Project Implementation Handbook, NHB 8820.2(FPIH), but rather it is intended to supplement it with procedures that are specific to projects conducted at this Branch.

1.1 SCOPE

The approach represented in this document is to define a framework for project planning, management, design and construction. This framework is intended to help ensure a consistent process for peer review, incorporating non-design related considerations, project scheduling, cost control, and quality assurance. In the interest of brevity, it is necessary to attempt to reduce complex highly variable creative processes and roles to their core functions. The process of developing this document encourages the evaluation of the existing project processes and personnel roles, leading to the streamlining of some existing processes and the formalizing or clarifying of other processes and roles. As the nature, type, budget, and schedule of projects vary widely, so does the project management. However, many of the key functions in the project development process are present and vary only in complexity as appropriate for the project under consideration.

1.2 PROJECT PROCESS OVERVIEW

In response to an identified facility requirement, Code 228 management assigns a project manager. This person identifies the scope of the requirement, explores solutions and develops preliminary estimates for design and construction. Depending on the scope of the requirement, the project manager may request technical assistance from appropriate personnel in relevant disciplines. These recommendations are compiled in writing to the Engineering & Planning Group Lead. The Engineering & Planning Group Lead may request additional information or options as needed for Code 228 management and resource office personnel to seek funding for the project.

If funding is provided, the project manager is directed to prepare a project management plan (PMP) identifying design support needed to form a project team. If the scope or complexity of the project warrants, a request for proposals (RFP) may be developed to seek the assistance of project specific Architectural / Engineering Consultants (A/E's). The project team is assigned by

Code 228 management and NASA contractor management based on request made by the project manager in the project plan. The project team includes NASA personnel, NASA contract personnel and A&E's with experience and expertise in areas relevant to that specific project as appropriate. The project team is responsible for the successful and timely completion of the project design and assembling the project design package. The project design package includes engineered drawings and specifications as needed to define the project for construction by a qualified contractor. Upon completion and in-house review of the project design package, the design package is forwarded to procurement. As project construction funds allow, projects are let for competitive bid to qualified contractors or constructed in house by NASA personnel or NASA contract support personnel depending on the scope, complexity, and current in-house workload.

Construction inspection and management is provided by the Construction Management Group for projects that are competitively bid and constructed by independent contractors. These inspections provide a check that the project is being constructed in accordance with the plans and specifications and all relevant code and safety regulations are being observed. The inspection and management personnel also help to resolve unexpected problems that arise during construction by consulting with the contractor, project manager, and project engineers as necessary. The Construction Management Group also receives and routes request for information (RFIs), contract modifications, etc. which document the clarification and modifications to contract documents.

As indicated in this overview, the project manager is the key to an effective project management process. Professional judgement, diligence and good communication on the part of the project manager is essential to meet the goal of effective project management.

2.0 Project Initiation Process

2.1 Work Request Procedures

All project work (Center Funded or CoF) will be submitted through the planning office as described in Section 3.0 below and tracked through the FPMS system and various other appropriate Management Information Systems (MIS).

2.2 Work Assignment System

2.2.1 Projects

Project managers will be assigned by the Engineering & Planning Group Lead and the support contract manager. The Project Manager is typically assigned in the planning phase and will manage the project from planning through construction. Project engineers, drafters, and project administrative support will be assigned based on the requirements identified in the project plan as described in section 4.1 below. Construction inspectors are assigned by the Construction Management Group Leader and/or the support contract manager.

2.2.2 Request for Engineering Services

Non project related requests for engineering services will be assigned by the Engineering & Planning Group Lead and the support contract manager as required. Customers and Branch personnel may also request services of an engineer directly for very limited scoped work that can be handled in less than a day, however, such services shall be coordinated with the Engineering & Planning Group Lead.

3.0 Planning

This section outlines the facility planning process for facilities projects from initiation to submission for Center evaluation.

3.1 Planning Process

3.1.1 Call Letter

The Facilities Branch head sends a letter to all directorates requesting programmatic, institutional, and quality of work life facilities related requirements at the end of March each year. This letter includes information regarding last years Facilities Design & Construction Programs. The letter directs the requester to submit to the planning office their requests, including a detailed description of requirements, basis of needs, and a cost estimate if known.

3.1.2 Requirements Evaluation

The Facility Planners are responsible for the collection of project data. This usually involves the planners assisting the individual users in producing the requests. Sources for facility requirements include: Program offices, code/branch managers, safety office, environmental office, engineers within FMB, operations and maintenance task area monitors, O&M contractor personnel, past year project lists, five year plan, and project managers of multiyear projects.

It is the responsibility of the Facility Planner, in coordination with the Engineering & Planning Group Lead, to evaluate the feasibility of all requests for facility work based upon their basis of need and suitability of existing facilities available. If there are no existing facilities available to meet the user requirements, then a plan shall be developed for modifying existing facilities or creating new facilities to meet the requirements.

3.1.3 Project Formulation

The Facility Planner shall assimilate all requirements documentation from the user and develop a project planning package. The package shall include:

Title
Scope
Description

Basis of Need
Preliminary Cost Estimate

3.1.4 Project Classification

The Facility Planner shall classify the projects into the appropriate funding category, CoF, Center Funded, or Multi Year Funded. The following is a brief explanation of each category. Consult FPIH(NHB 8820.2) for further information.

3.1.4.1 CoF

CoF Projects are further categorized into Discrete (over 1.5 million dollars), and Minor Construction (500 K to 1.5M dollars). Minor construction includes Repair, Rehab and Mod; Minor Construction; Safety; and Environmental.

3.1.4.2 Center Funded

Center Funded projects (also called the rehab and mod program) are categorized as what purpose they serve, i.e. Programmatic, Institutional, Safety, Quality of Work Life. They are further classified as follows:

Class I projects are from $ 0 to $ 2,500
Class II projects are from $2,500 to $25,000
Class III projects are form $25,000 to $500,000

3.1.4.3 Multi Year

Projects between 0 and $500K and within the scope and definition of Multi Year Funded Projects are submitted to each PM of Multi Year Projects to establish annual requirements.
Multi year projects are projects that are recurring in nature and include, but are not limited to, the following categories:

Water Utility Systems, Building Exterior Restoration, Electrical Manholes, Elevator Restoration, Exterior Painting, Foundation Restorations, Floor Restoration, HVAC, Interior Painting, Power Monitoring, Street Light/Exterior Light Restoration, Tour Routes, Window Installation, Paving/Sidewalks, Roof Replacement, Vestibule Installation.

3.1.5 Project Finalization

It is the responsibility of the Facility Planner to finalize the project planning documents. Formal estimates are prepared by the Facility Planner or by an assigned project manager. Projects over $50,000 require that a Facility Project-Brief Document, Form 1509 and a Facility Project Cost Estimate, Form 1510, be prepared by the Facility Planner. All 1509's and 1510's are prepared through the use of the FPMS Computer Software System by the FPMS Administrator.

3.1.6 Project Evaluation

It is the responsibility of the Facility Planner to pre-evaluate each project separately according to category and type, in preparation of formal project scoring by the Facilities Coordination

Committee(FCC). Evaluation consists of rating each project according to an established set of criteria and assigning the project a score for each criteria. Projects are to be listed on the appropriate scoring sheets. (See the Integrated Facilities Budget Call Book for more information.)

3.1.7 Project List Presentation

It is the responsibility of the Engineering & Planning Group Lead with the assistance of the Facility Planner to organize all project elements to make formal presentations to the WFF and Greenbelt FCC.

A presentation of project listings and evaluations is made to the WFF FCC. Any input they have is incorporated into the project listing document. The WFF FCC prioritizes the projects.

A second presentation of projects is made to the Greenbelt FCC. It is the responsibility of the Engineering & Planning Group Lead and Facility Planners to present the WFF candidate projects and defend their ratings to be incorporated into the overall GSFC program. The Greenbelt FCC may request additional information during the scoring process.

3.1.8 Project List Finalization

It is the responsibility of the Greenbelt FCC to finalize and prioritize the combined project listings for the entire Center for presentation to NASA Headquarters or GSFC senior management for approval and inclusion in the appropriate budgets.

3.1.9 Five Year Plan

It is the responsibility of the Engineering and Planning Group Lead to formulate and present a Five Year Plan showing WFF projected facility needs. Presentation of this plan is made to the WFF and Greenbelt FCC's.

3.2 Planning Files

The Facility Planner shall maintain planning files, for both current and past projects, that are to be accessible to Branch personnel at all times. The files shall contain, at a minimum, the project scope, a budgetary estimate by discipline, name of planner, requester and requirements manager, and copies of all documents that have been submitted in the planning process.

4.0 Project Design Procedures

4.1 Project Management Plan

The Project Manager shall prepare a Project Management Plan at the start of the project design, submit for approval by the Engineering & Planning Group Lead, and disseminate to all parties

involved (See Appendix A for an outline of the Project Management Plan). The project plan shall include all of the elements that are key to the production of the project, delineated to the level of detail necessary for that project by the Project Manager. The plan shall include:

4.1.1 Project Scope
The project scope shall include a detailed description of the project.

4.1.2 Project Requirements
The project requirements shall be identified and listed with the name and phone number of the requirements manager. The requirements manager is assigned by appropriate senior management of requester.

4.1.3 Project Organization
The project organization section shall contain project information as follows:

4.1.3.1. Project Administrative Data
Provide a listing of Project Name, Project ID, and Project charge numbers.

4.1.3.2 Design Team
Provide a list of all Project Design Team members with project responsibilities and phone numbers. The design team will include design engineers as assigned, construction management representative, drafter, project manager, and an operations & maintenance representative.

4.1.3.3. Client Team
Provide a list of all clients involved in the projects, to include full names, organization, phone numbers and project role. This list should include the building's Facility Operations Manager (FOM), Requester, and Users.

4.1.3.4 Key Personnel Contact List
The plan shall identify key personnel that must be contacted when the execution of construction work disrupts normal facility operations. This list should include at a minimum, the building FOM and the branch head of personnel in affected work area and shall designate when these personnel require notification and the person responsible for making notification.

4.1.3.5 Design Review Team
The plan shall identify all personnel that shall be responsible for the design review process, with full names, phone numbers, and project responsibility. The design review team will include Design Team, Safety, Environmental, and the Requirements Manager.

4.1.4 Project Schedule

The plan shall include a schedule of milestones which include the date of the initial project kick-off meeting, project meetings, long lead items, the required completion date and all design reviews with their duration. The PM shall establish the schedule based on NASA's requirements to meet a completion date as well as project requirements.

4.1.5 Project Deliverables

The plan shall identify the project deliverables and detail items required by each discipline engineer for each review submission (30%, 60%, 90%, 100%).

4.1.6 Budget and Cost Estimate

Provide estimate of construction and design funds available for each discipline.

4.1.7 Design Standards

The PM shall include a list of design standards with references to appropriate manuals as required to include the following:

4.1.7.1 Drawing Standards

The plan shall designate Metric vs. English units, title block to be used, drawing numbering system, etc. Reference of the drafting standards manual shall be used where appropriate.

4.1.7.2 Specifications Standards

The plan shall designate metric or English units, and any special requirements.

4.1.7.3 Estimating Standards

The plan shall designate metric or English units, project burden, G&A and profit amounts, and escalations due to out year price increases. Also, the plan shall state any additional requirements such as spreadsheet to be used and source of cost data (i.e. RS Means, Timberline program).

4.1.7.4 Engineering Standards

The plan shall designate any special engineering or code requirements that may be unique to the project.

4.2 Design Standards

Projects shall be designed in accordance with Chapter 5 of the Facilities Project Implementation Handbook; and the following HQ guidelines and/or programs shall be applied in the design: NPD88201-Design and Construction of Facilities; NPG88202C-Facility Project Implementation Handbook, Reliability Centered Maintenance, Constructability, and Building Commissioning. Project specific design standards shall be specified in the project plan by the PM if required.

4.3 Specifications

4.3.1 SPECSINTACT System

The Specsintact system is a PC based word processing/data base system that contains standard specifications for NASA, NAVY, and Army Corp of Engineers. The specifications are in CSI format in metric and English units. The specifications are edited by the project engineers to suit the needs of the individual project.

4.3.2 Specification Process

The PM shall distribute the specification pull form to all discipline engineers on the project. The discipline engineers will select the required sections for their discipline and return to the PM. The PM assimilates the information and submits the submittal request form to the Specsintact operator for the first pull. The PM is responsible for distribution and collection of the specification sections to the discipline engineers for editing and review of the edited specifications. Typically there are at least two editing cycles of the specifications.

4.3.3 Administrative

The Specsintact manager is responsible for updating the system with the latest software revision. The specifications are updated once a year. The Specsintact Manager is responsible for assimilating all input from the engineers at WFF for incorporation into the next revision.

4.3.3.1 Local Sections

Local sections are also incorporated into the system that include specifications that are unique to WFF. The Specsintact manager is responsible for updating and managing the local sections. It is the responsibility of the project engineers to create the local sections and to keep the specifications in the local sections current.

4.4 Estimating

The PM is responsible for preparing an engineered construction cost estimate at various times throughout the project. The estimate is based on Means construction cost data, past projects, the availability of materials and expertise, and current and anticipated economic conditions. The PM assimilates the estimates of the project engineers into a project estimate. The estimates should be updated at 30%, 60%, 90% & Final design status.

4.4.1 Mark ups

The estimate shall include mark ups for overhead, both material and labor, general and administrative costs, contingencies, bonding costs and profits, (and construction management costs, for CoF projects only)(See Appendix B for actual markup values).

4.5 Design Review Procedure

4.5.1 Design Review Meetings

Design Review Meetings shall be held at regular intervals to ensure project requirements are being met, to validate the design process and the constructability of the design. The Project Manager schedules the design review meetings.

4.5.1.1 Meeting Frequency and Schedule

Design Review Meeting frequency and schedule shall be set by the PM in order to meet design deadlines and included in the PMP as described in 4.1.4.

4.5.1.2 Attendees

Design meetings shall be attended by the design team, client team designee, and review team as designated in the project plan.

4.5.1.3 Design Review Package

The PM shall distribute to the review meeting attendees the following, a minimum of 5 working days prior to the design review meeting:

A. 1 complete set of design drawings finished to the designated level of design. (See FPIH, Figure 5.9.2 for criteria for 30%, 60%, and 90% reviews).

B. The public directory containing the electronic file for the design specifications, in "read only format", edited to the designated level of design.

4.5.1.4 Minutes

Minutes of the Design Review Meeting shall be compiled by the Project Manager and distributed to attendees of the Design Review Meeting no later than 10 days after the design review meeting.

Minutes shall include items discussed pertinent to the design and any action that will be taken to resolve design discrepancies and also any previous action items still not resolved.

4.5.2 Design Review Procedures

4.5.2.1 Daystamping

All AutoCAD drawings shall be daystamped prior to plotting. Daystamp shall appear in the lower left-hand corner of the title block and shall include the file location, file name and date the drawing was plotted.

4.5.2.2 Design Percentage

The percentage of design completion shall be imprinted on the cover sheet of the design package prior to distribution for review.

4.5.2.2 Review Methodology

Drawings shall be marked by the Project Manager or Discipline Engineer for corrections by the Drafter using red ink or red pencil.

Drawings shall be marked by the Drafter with yellow high-lighter showing that red-lined corrections have been made to drawings. Copies of the corrected drawings and the red-lined drawings shall then be given to the Project Manager for verification.

4.6 Design Changes Process

4.6. 1 User Requested Changes During Design

Changes to the design will be accommodated due to changes in requirements to the greatest extent practical. However, after the project reaches 60% completion, changes in requirements become problematic.

After the design has reached 60% completion, any changes in requirements must be submitted in writing to the PM for consideration. The request will detail the change in design requirement and the justification for the design change. The Project Manager will assess the impact of the design change in terms of budget and design schedule, then will forward his assessment and recommendation to the Engineering & Planning Group Lead or Branch Head for approval or disapproval. After approval or disapproval by Engineering Group Leader or Branch Head, the results of and reason for the decision will be conveyed to the user or person requesting the change.

4.6.1 Design Changes Prior to Advertisement

Written justification will be required for the design change. The design change will be reviewed by the Project Manager and Engineering & Planning Group Lead, the drawing will be given a revision date, and the group leader will re-sign the drawing. Drawing changes made after sign-off by the Engineering & Planning Group Lead will require the approval of the user, the Group Leader and the Project Manager.

4.6.2 Design Changes After Advertisement

Design changes made after advertisement require approval as listed in 4.6.1 above, and a contract amendment. Contract amendments will be drafted by the PM and submitted to the CO. Contract amendments may be either in writing, by sketch, by revised drawing or by issuing a completely new drawing.

4.7 DESIGN PACKAGE PROCESS

The Design Package Process describes the process of keeping all essential records necessary to manage and execute the project successfully. This process starts with the NASA FPIH project documents received by the Project Manager.

4.7.1 AUTHORIZATIONS AND SIGNATURES

This section does not discuss the authorizations and signatures already obtained in the project development, planning and design process. It deals primarily with the processes occurring through the Final Design phase. This includes the drawings and specifications and other related documents.

4.7.1.1 DRAWINGS AND SPECIFICATIONS

The Project Manager, Discipline Engineers and CAD operators shall be responsible for signing and initialing the appropriate signature and check blocks on the drawings (see Drawing Approval Blocks). Once the Final Design process is complete, the Project Manager shall obtain the authorizing signatures of the appropriate personnel representing the FMB Branch Head, FMB Engineering, NASA Health and Safety and Fire Protection. These signatures must be obtained before the Procurement Package can be sent to Procurement(see 4.7.2).

4.7.1.1.1 DRAWING APPROVAL BLOCKS

Every drawing sheet will be signed in the appropriate blocks as follows:

- **Project Engineer** – the designer, discipline engineer or architect responsible for performing the work on the drawing (i.e., mechanical engineer signs mechanical sheets, etc.)
- **Submitted By** – The Project Manager primarily responsible for the entire project.
- **NASA Safety** – The designated NASA institutional Safety representative (usually part of the design review team).
- **Fire Protection** – The Fire Safety representative (usually part of the review team).
- **Engineering Approval –** Engineering Group Leader or assigned designee
- **Branch Approval** – Branch Head or assigned designee

4.7.1.1.2 AUTOMANAGER CONFIGURATION CONTROL

Once the Final Design is completed and authorizing signatures are obtained, the Project Manager shall inform the Configuration Specialist to ensure that the drawings are properly placed in the Auto Manager que and stored on the read only network drive (F:/ facilities).

4.7.2 PROCUREMENT PACKAGE PROCESS

The Project Manager, together with the Contract Specialist, shall assemble the Final Design package for Procurement. The Procurement package shall consist of the following:

- 3 sets of half sized Final Design drawings
- original and one copy of the Specifications

- 1 copy of Purchase Request from the Facility Resource Specialist
- 2 copies of letter concerning Liquidated Damages and/or Incentive Clauses from the Construction Management Group Lead
- 4 copies of Boiler Plate
- 3 copies of Cost Estimate

Once the packaged is assembled, the Project Manager shall perform a final checkout on the package for completeness (i.e., content, signatures, correct number of copies, etc.). After final checkout, the Contract Specialist shall send the package to Procurement.

4.7.3 PROJECT MANAGEMENT FILE

The Project Manager shall create and maintain a Project Management File from the inception of the project. The file data can be in various forms of media, such as, electronic (i.e., word processing files, spreadsheets, databases, E-mail, etc.), paper or hard copy, FAX copy or any other appropriate form. The file is expected to be dynamic in that it will change to reflect the progress of the project. The Project Manager shall exercise his or her technical and professional discretion as to exact content of the file, but Configuration Control is the objective.

At the beginning of the Final Design stage, at a *minimum*, the Project Management File will contain the following:

- 1 copy each of pertinent NASA FPIH documents (e.g., Brief Project Description, 1509, 1510, etc.)
- 1 copy of the PMP

During the Final Design phase of the project, all pertinent documentation developed shall be added to the Project Management File. Some of this documentation shall automatically be generated and kept by existing project management programs and procedures. Documentation to be added includes:

- Design Review meeting minutes & notes (i.e., 30, 60, 90 %, etc.)
- Updated Project Plan and FPMS project logs
- Updated Cost Estimates
- Updated CAD drawings

Upon completion of the Final Design and the Procurement Package, one element each of the Procurement Package shall be added to the Project Management File:

- 1 set of half sized Final Design drawings
- 1 copy of the Specifications
- 1 copy of Purchase Request from the Facility Resource Specialist
- 1 copy of letter concerning Liquidated Damages from the Construction Management Group Lead
- 1 copy of Boiler Plate
- 1 copy of Cost Estimate

Additional documentation can be generated during the Procurement and the Construction and Inspection stages of a project and shall be maintained in the Project Management File. Examples are:

- Site Visitations Commentary
- Contract Amendments
- Bid Results
- Pre-Construction Meeting
- Change Orders
- Lessons Learned Document

After Construction and Inspection of the project are complete, the Project Manager and each discipline engineer shall review the Project Design and Project Management Files in order to determine their final content.

4.7.4 PROJECT DESIGN FILE

A Project Design File similar in content and format to the Project Management File shall be created and maintained by each discipline engineer involved with a particular project. Each discipline engineer shall be supplied with copies of pertinent project information necessary for him/her to conduct his/her portion of the project design.

At the beginning of the Final Design stage, each discipline engineer shall be provided with the following by the Project Manager:

- 1 copy each of pertinent NASA FPIH documents (e.g., Brief Project Description, 1509, 1510, etc.)
- 1 copy of the PMP
- 1 copy each discipline of Engineering Design Criteria, Calculations, and Data (developed in the planning stage)

During the Final Design phase of the project, all pertinent documentation developed by each discipline engineer shall be added to the Project Design File. Copies of all appropriate data shall be added to the Project Management File in the appropriate media format. Some of this documentation shall automatically be generated and kept by existing project management programs and procedures. Documentation to be added includes:

- Design Review meeting minutes & notes (i.e., 30, 60, 90 %, etc.)
- Updated Project Plan and FPMS project logs
- Updated Cost Estimates
- Updated CAD drawings via AutoManager
- Engineering design criteria, calculations and data pertinent to specific discipline
- Pertinent parameters, standards and other design considerations
- Electronic files and other records of all pertinent activity relating to the project for that specific discipline.
- Catalog cuts

Upon completion of the Final Design, Project Design File shall include:

- 1 set of Final (100%) Design drawings (for that discipline) in CAD format.
- 1 copy of the discipline Section of the Specifications in SPECINTACT format.
- 1 copy of Cost Estimate in spreadsheet format

During the Procurement, Construction and Inspection stages, documentation and data relating to the following shall be added to the Project Design File:

- Record of site visit, amendments, RFIs, pre-construction meeting, bids, and lessons learned

After Construction and Inspection of the project are complete, each discipline engineer shall review the Project Design File with the Project Manager in order to determine the final content of the Project Management File. Each discipline engineer shall be responsible for their portion of the final content of the Project Design File.

5.0 CONSTRUCTION MANAGEMENT

For Construction Projects which are competitively bid, the Construction Management Group Lead/COTR has project authority once the project is sent to Procurement. However, the PM still maintains responsibility for configuration management until the completion of the project.

5.1 PRE BID PROCESS

Prior to opening bids, a pre bid conference or site visit will be conducted. The date, time and place will be stated in the Boiler Plate. All prospective bidders, including all interested General Contractors and Sub-Contractors are invited to attend this site visit. Also attending this site visit will be the Construction Management Group Lead/COTR, the Project Manager and the Inspector assigned to the project.

During the meeting, which will be conducted by the Contracting Officer's Technical Representative, the scope and description of the project will be reviewed. After this initial meeting, all interested parties, under escort, will be given the opportunity to visit the site of the proposed project.

No questions will be answered at this visit. It will be requested that all questions be put in letter form and be forwarded to the Government as soon as possible. A specific cut off date will be

given in the specifications for this. The Government will not answer any questions submitted too late to permit transmittal to all potential offerors reasonably in advance of the due date.

If a warranted cause is found prior to the announced bid opening date, an amendment to the contract documents will be issued to all offerors. This could result in a delay in the bid opening. If so, a new bid opening date will be announced.

5.2 BID OPENING PROCESS

A specific date, time and place, for bid opening will be stated in the Boiler Plate. Sealed offers in original and 2 copies to perform the work required are due at the place specified. If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offer's name and address, the solicitation number, and the date and time offers are due.

Bids will be opened at the time specified, by the Contracting Officer. All sealed bids will be opened, examined for proper documents, and the estimates by the offers will be read aloud.

5.3 PRE CONSTRUCTION CONFERENCE

Prior to start of work, a pre construction conference will be held. The PM shall attend this conference scheduled by the Contracting Officer. Work will not commence prior to the conference. The Prime Contractor and his Subcontractor representatives shall also attend.

Discussion shall address project orientation, special requirements, personnel contact, safety issues, permits, deficiencies, and the location of the Contractor's office. The Contractor shall submit the project submittal schedule at this meeting. Care shall be taken to minimize impact to residing personnel in affected facilities.

5.4 SUBMITTAL REVIEW

Submittals consist of information provided by the Contractor to the Facilities Management Branch to show compliance with the project construction documents. The number of copies of submittals, which is designated in the Specifications, will be forwarded to the Contracting Officer for review. A copy of each Government Approved submittal will be distributed to the Contracting Officer, the Project Manager, the Project Inspector, a copy for the branch files, and the remaining copies will be returned to the Contractor for his use and distribution to his Subcontractors.

The Project Manager will review submittals and provide pertinent notation within fourteen calendar days after date of submission. Submittals will be returned to the COTR with the following notations:

a. Submittals marked “approved” authorize the Contractor to proceed with the work covered.
b. Submittals marked “approved as noted” authorize the Contractor to proceed with the work as noted, provided he takes no exception to the corrections.
c. Submittals marked “not approved” or “disapproved” indicate noncompliance with the contract requirements and shall be re-submitted with appropriate changes. No item of work requiring a submittal shall be accomplished until the submittals are approved or approved as noted.
d. The Contractor shall make corrections required by the Contracting Officer. Approval of the submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. No item of work requiring a submittal change shall be accomplished until the changed submittals are approved

Approval of the Contractor’s submittals by the Contracting Officer does not relieve the Contractor of his responsibilities to fulfill the requirements of the Contract Documents.

5.5 CONSTRUCTION INSPECTION

The Construction Inspector is responsible for ensuring the Construction Contractor’s work adheres to the contract specifications. A Lead Inspector shall be assigned to each construction project. All field communications with the Construction Contractor shall be conducted through the Lead Inspector.

The inspector shall notify the prime Contractor when work is not adhering to the contract specifications; however, the inspector shall not direct the contractor in any way. The Lead Inspector shall inform the COTR and the Project Manager of discrepancies that are not resolved adequately by the contractor.

5.5.1 Safety

Construction Contractor operations shall be monitored by the inspector for compliance with the NASA, OSHA, the Life Safety Code , and State of Virginia safety and the Construction Contractors approved safety plan. The inspector shall notify the contractor of safety violations. If the inspector observes a life threatening violation, the inspector shall notify the contractor to immediately correct such actions or stop work if necessary.

5.5.2 Materials

The Construction Inspector shall verify that all materials are new (or used as per contract drawings) and as indicated on the approved submittals and that all materials are stored in accordance with the Construction Contract.

5.5.3 Coordination

The Construction Inspector shall coordinate construction activity so as to minimize disruption to the facility operations. The construction inspector shall notify the key personnel listed in the Key Personnel Contacts List in advance of any disruptions to facility operations. Utility outages shall be coordinated in advance with the COTR, building FOM, and Operations personnel and shall conform to FAR 51.236-14 and contract documents.

All work to be performed outside of normal working hours (M-F, 8A.M. – 4:30P.M.) shall be approved in advance by the COTR.

5.6 DOCUMENTATION

5.6.1 Log Book

The inspector shall maintain a daily logbook for the duration of each contract. At the completion of the contract, the logbook shall be turned in to the COTR for inclusion in the contract file. This logbook shall become a legal document. No blank pages shall be left in the logbook. No pages shall be removed from the logbook. Editing shall be accomplished by a single line through the notations and shall be initialized by the inspector.

The following shall be noted in the logbook:

All deviations, changes
Deficiencies,
Delays,
Safety violations,
Names of any visitors accompanying the inspector to the job site
Summary of conversations with the prime contractor, including any problems mentioned by the Contractor or the inspector.

All entries shall be in ink and legible and shall be initialed and dated by the inspector.

5.6.2 Contract File

The COTR shall keep an official contract file. The file shall be initialized when the design package is sent to Procurement.

The Contract File shall contain:
Copy of initial design package as sent to procurement,
Project correspondence,
One copy of all approved and/or disapproved submittals,

Copies of invoices for payment,
Contract specifications,
Contract drawings,
Contract changes,
Mods/Amendments,
Insurance paper,
Miscellaneous including procurement requests, safety plan,
Payrolls,
Daily reports,
Wage surveys.

5.6.3 Invoice for Payments

Invoice for payments will be submitted by the contractor directly to the Fiscal Office, Code 150. The COTR is responsible for approval of invoices; copies of the invoices shall be distributed to the Project Manager and Lead Inspector for review.

5.6.4 Wage Surveys

Wage surveys shall be performed by the Inspector at the discretion of the COTR and submitted to the COTR for approval.

5.7 CONSTRUCTION MODIFICATIONS

5.7.1 Field Changes

Field changes are of limited scope that are performed at no additional cost to the Government and are of no benefit to the Contractor. Field changes can be initiated by the Contractor, inspector, COTR, or the PM and can be approved by the Project Manger or COTR. Field changes shall be documented on the Daily Report, on the "red-lined" drawings, and in the Inspector's LogBook.

5.7.2 Contract Modifications

Contract modifications are any change in the contract work that can not be accomplished as a field change. Contract modifications can be initiated by the Contractor, Inspector, COTR or the PM. Contract modifications shall be approved by the CO.

5.7.2.1 Contract Modification Process

The PM shall submit to the COTR for evaluation a scope of work, specifications, drawings, and cost estimate for the proposed change in work. The COTR requests a written proposal from the contractor. The COTR submits the recommendations for the change in work, including the scope, specifications, drawings, Government estimate, and the contractor's proposal to the CO.
The PM shall ensure that all changes are documented on the as-built drawings.

5.8 REQUESTS FOR INFORMATION(RFI)

The PM is responsible for responding to written RFI's initiated by the Construction Contractor. The response shall be submitted to the Construction Contractor through the COTR and shall be distributed to the CO and the Contract File.

5.9 AS-BUILT DRAWINGS

The PM is responsible for reviewing the Contractor's red-lined drawings for accuracy and for ensuring that the red-lined information is accurately reflected on the revised construction drawings(As-builts) and the Configuration Drawings(CD). The as-built and configuration process is described in the Configuration Management Manual.

5.10 PROJECT FINAL ACCEPTANCE

The project final acceptance is accomplished at the final walk through by the COTR or Contracting Officer, Project Manager, Project Inspector, and the contractor's representative. All training, systems check out, and operational requirements must be accomplished prior to the final walk through. At the discretion of the COTR, the following acceptance methods are possible:

Accept the project as complete with no punchlist or accept the project with a punchlist for final completion by an established date.
Establish a Beneficial Occupancy date for acceptance by the Government in order to utilize the facility with some punch list items to be completed at a later date.

5.10 CONTRACT CLOSE OUT

The following items shall be performed at the conclusion of the contract:

The PM shall submit the approved as-built drawings to the Configuration Management Specialist in accordance with the Configuration Management Manual.
The PM shall complete the contract paper work, including the 1046 real property voucher, prior to the payment of final invoice.
The PM shall ensure that the inspector's project log is turned over to COTR.
The PM shall distribute O&M manuals to the appropriate operations personnel.
The COTR shall certify and submit to the CO all payrolls.
The COTR shall submit financial closeout paperwork to the CO.

6.0 FACILITY PROJECT MANAGEMENT SYSTEM

The National Aeronautics and Space Administration (NASA) Facilities Project Management System (FPMS) facilitates the tracking of construction of facilities projects. It is an automated information management system developed to meet the following objectives:

- Provide a viable data base for planning, budgeting, implementing, and overseeing the NASA facilities program in order to follow the progress of facility projects from concept through activation.
- Permit engineering/management evaluations to ensure that the most effective and economical facility is built or modified to satisfy user requirements.
- Provide prompt and accurate data to verify that the design and construction of facility projects are within scope and budget, and are on schedule.
- Identify technical and other problems which could cause cost overruns, delays, or substandard facilities.
- Permit effective facilities program and project management by Field Installation project managers and Field Installation and Headquarters facilities.

6.1 Data

The following three modules are an overview of the information typically used during the course of project planning, design and construction.

All other categories (buttons) not listed below are not used or are the responsibility of the FPMS Administrator.

The FPMS Administrator is responsible for weekly maintenance of the system, re-indexing & packing, also updates from design status review meeting, deleting & input of Projects, assignments of staff and maintaining & setup of users access groups and running & printing of all reports.

6.1.1 Planning Section

All information in categories listed under planning module are entered and kept updated by the FPMS Administrator.

6.1.2 Management Section

The Resource Specialist updates all Funding categories.

The Project Log category is the responsibility of the Project Manager, the scopes for the milestone and the project status updates are entered here.

6.1.3 Contract Section

The contract module consists of several categories with the following responsibilities:

Initial Contract-Project Manager/Construction Management Office/FPMS Admin
Scheduling & Tracking- Project Manager/FPMS Admin
Bid Info-Construction Management Office/FPMS Admin
Mods-Resources/FPMS Admin
Funds- Resources/FPMS Admin
Payments-Construction Management Office/FPMS Admin
A/E Selection-FPMS Admin

6.2 Data Input

All data entry must be entered in a timely manner, always before the 20th of the month and depending on the scheduling of the Project Design Meeting. All reporting information must be uploaded to HQ via FTP by the 10th of the following month.

6.3 FPMS USER'S GUIDE

The Challenged User's Guide is available for FPMS users who need guidance using the system; this guide will be updated periodically, as needed. The administrator is available for assistance when needed.

6.4 Reports

The FPMS administrator is responsible for generating the following reports:

Project status report prior to Project Design Meeting distributed at meeting.
Project summary report generated weekly and distributed to PM's and Group leader
HQ report sent to HQ

7.0 CMMS

The O&M Group operates several CMMS that are important to the Engineering Group, Maximo and the Facilities Assessment Database.

7.1 Maximo

Maximo is the Branch CMMS used primarily to track the work of the in-house maintenance and operation contractor. In addition to information available on maintenance and small construction projects performed by the in-house contractor, the system also is used to track engineering requests for very limited scope engineering design work such as may be related to an in-house construction project or a problem with the operation of the facility. Maximo is also a very useful and powerful tool for engineers to use to view information on facility equipment, such as make, model number, condition, maintenance history, operating parameters, etc.

7.1.1 Engineering Requests

Requests for engineering services from the Facility O&M Group will be submitted through the Engineering/Planning Group Leader and will consist of a hard copy of the work order and a scope of engineering work required. The status of the work order will be entered as WENG, waiting for engineering support, until the engineering services have been completed. A list of all outstanding engineering requests is available in the Maximo system by searching the work orders in WENG status. See the Maximo user manual for more information.

7.2 Facilities Condition Assessment Database

The Facilities Condition Assessment Database is operated and maintained by the O&M Group. The data is populated by O&M personnel conducting periodic condition assessments of the facility. The database should be consulted during the planning and design phases of projects. Data can be accessed either by Building or by system type (i.e. Roofs) and includes estimates of replacement costs.

APPENDIX A
Project Management Plan Outline

Project Title, Project Number

1.0 PROJECT MANAGEMENT PLAN

1.1 Scope

This area is to describe the scope of the project.

1.2 Project Team

Project Manager:

Architect:

Mechanical Engineer:

Electrical Engineer:

Structural Engineer:

Peer Review:

Drafter:

Construction Management:

1.3 Customer List

Building FOM:

Customer:

1.4 Review by List (Review of Plans & Specs.)

Facilities Engineering:

Environmental:

Facilities Operation & Maintenance:

Industrial Safety & Health:

Fire Protection:

Building FOM & Customer Relations:

1.5 Approval List (Sign off on Plans & Specs.)

Project Engineer:

Project Manager:

Industrial Safety & Health:

Fire Protection:

Engineering Group Leader:

Facilities Management Branch Head:

1.6 Schedule

The schedule must be coordinated with other projects in the office before a final schedule can be developed. Tentatively, the schedule is:

30% Design Due Prior to xx/xx/xx.

60% Design Due Prior to xx/xx/xx.

90% Design Due Prior to xx/xx/xx.

100% Design Due Prior to xx/xx/xx.

1.7 Deliverables

A full set of drawings for each of the reviewers listed in Part 1.4 above shall be completed by each discipline engineer and given to the Project Manager prior to the above scheduled due dates. These design drawings shall be completed to the benchmark criteria set forth for 30%, 60%, 90% and 100% designs. All drawings sent out for in-house review shall be plotted "C" size. 100% drawings shall be plotted full size.

A full set of specs shall be edited to the 60%, 90% and 100% level of completeness and given to the Project Manager prior to the above scheduled due dates. Specs shall be edited to the benchmark criteria set forth for 30%, 60%, 90% and 100% designs.

One copy of an updated design estimate shall be given to the Project Manager prior to each of the above scheduled due dates.

1.8 Preliminary Estimate and Budget; Design and Construction

The Design budget (in man-hours) for this project is allocated approximately as follows (may be adjusted at the 30% phase):

	Man-hours
Architectural	xxx
HVAC	xxx
Electrical	xxx
Civil/Structural	xxx
Drafting	xxx
Specs	xxx

The Construction budget for this project is $x,xxx,xxx, allocated approximately as follows:

Architectural	$xx,xxx	xx%
HVAC	$xx,xxx	xx%
Electrical	$xx,xxx	xx%
Contingency	$xx,xxx	xx%
SIES	$xx,xxx	5%
Total	**$xx,xxx**	**100%**

1.9 Design Standards

The design should conform to all relevant NASA standards and guidelines as well as any other relevant federal, state, or local statues, ordinances, or codes. Fire protection system shall be in accordance with current NFPA guidelines. Additionally, the project shall reflect good engineering design and judgement as determined by the Project Engineers and the Project Manager.

<specifier notes: choose the first paragraph for projects that will be competitively bid; choose the second paragraph for projects that will be constructed “in-house”>

[Project Plans and Specifications shall be prepared using the Metric units of measurement (for CoF projects only) or English units of measurement (for Center Funded projects only) on NASA standard title block and conforming to design standards for preparation of packages suitable for bids. This project will be advertised for competitive bid and as such, a full design package will be required.]

[Project Plans and Specifications shall be prepared using the English units of measurement and conforming to design standards for preparation of Sketch Engineering Projects Designs for construction by "in-house" contractor.]

2.0 DESIGN REVIEW PROCEDURES

Design review meetings will be held in conjunction with the 60% and 90% design milestones as described in Part 1.6 above. It shall be requested that reviewer's comments be submitted in writing or submitted as Redline drawings at the design review meetings.

APPENDIX B
Standard Construction Estimate Mark-Ups

	LABOR	MATERIAL
Sub Totals of Construction Cost Estimate	$ 100	$ 100
Labor Burden @ 23%	23	
Material Burden @ 4.5%		5
Sub Total		228
Subcontractor @ 10%		23
Sub Total		250
Contractor O/H @ 10%		25
Sub Total		275
Contractor Profit @ 10%		28
Construction Cost Estimate Sub Total		303
Contingency @ 10%		30
Sub Total		333
SEIS @ 5%		17
Sub Total		350
Bond @ 1.5%		5

Total Project Budget	$	355